

WHAT IS CLAIMED IS:

- 1 1. A method for identifying a lead compound for diabetes drug
2 development, comprising:
3 contacting a first aliquot of cells expressing a Rheb protein with a candidate
4 compound under suitable conditions and for a period of time sufficient to affect Rheb
5 activity;
6 measuring a parameter of the first aliquot of cells, the parameter associated
7 with Rheb activity;
8 measuring the parameter in a second aliquot of control cells; and
9 comparing the measured parameters of the first and second aliquots of cells,
10 wherein a change in the parameter is associated with an increase in Rheb activity.
- 1 2. The method of claim 1, wherein the Rheb protein is over-expressed
2 and the parameter is cell size.
- 1 3. The method of claim 1, wherein the Rheb protein is over-expressed
2 and the parameter is cell viability.
- 1 4. The method of claim 1, wherein the parameter is glucose uptake or
2 utilization.
- 1 5. The method of claim 1, wherein the Rheb protein is human or
2 Drosophila Rheb protein.
- 1 6. The method of claim 1, further comprising:
2 utilizing the candidate compound as a lead compound for diabetes drug
3 development.
- 1 7. A method for identifying a lead compound for diabetes drug
2 development, comprising:
3 contacting a candidate compound with Rheb protein under conditions
4 conducive to binding of the compound to the Rheb protein;
5 detecting a resulting candidate compound-Rheb protein complex, and
6 determining whether the candidate compound increases or decreases Rheb
7 protein activity.

- 1 8. The method of claim 7, further comprising:
2 utilizing the candidate compound as a lead compound for diabetes drug
3 development.
- 1 9. The method of claim 7, wherein the Rheb protein is human or
2 Drosophila Rheb protein.
- 1 10. The method of claim 9, wherein the Rheb protein is human Rheb
2 protein.
- 1 11. The method of claim 7, wherein the candidate compound alters Rheb
2 GTPase activity.
- 1 12. The method of claim 7, wherein the contacting is in cultured cells, and
2 the stimulation of Rheb activity is detected by an increase in cell size or a prolongation of cell
3 viability.
- 1 13. The method of claim 12, wherein the Rheb protein is over-expressed in
2 the cultured cells.
- 1 14. The method of claim 7, wherein the contacting is in Drosophila larvae.
- 1 15. The method of claim 7, wherein the contacting is by administration of
2 the candidate compound to Drosophila during eye development, and the stimulation of Rheb
3 activity is detected by an enlarged eye phenotype.
- 1 16. The method of claim 7, wherein the Rheb protein is human Rheb
2 protein expressed in Drosophila cells.
- 1 17. The method of claim 6, wherein the candidate compound increases
2 glucose uptake or utilization.
- 1 18. A method for screening a library of candidate compounds to identify a
2 lead compound for diabetes drug development, comprising:
3 contacting the candidate compounds with cells expressing a Rheb protein
4 under suitable conditions and for a period of time sufficient to affect Rheb activity;

5 measuring a parameter of the contacted cells for a change in phenotype
6 associated with Rheb agonist activity; and
7 determining whether the candidate compounds stimulate Rheb activity to
8 identify a Rheb agonist.

1 19. The method of claim 18, wherein the measured parameter is cell size
2 or cell viability.

1 20. The method of claim 18, wherein the measured parameter is the size of
2 the eye in *Drosophila*.

1 21. The method of claim 18, wherein the measured parameter is glucose
2 uptake or utilization.

1 22. The method of claim 18, measured parameter is GTPase activity.

1 23. The method of claim 18, wherein the Rheb protein is over-expressed in
2 the cells.

1 24. The method of claim 18, further comprising:
2 utilizing the Rheb agonist as a lead compound for diabetes drug development.

1 25. A method for identifying a lead compound for drug development for a
2 disease associated with abnormal cell growth, comprising:

3 contacting a first aliquot of cells expressing a Rheb protein with a candidate
4 compound under suitable conditions and for a period of time sufficient to affect Rheb
5 activity;

6 measuring a parameter of the first aliquot of cells;

7 measuring the parameter in a second aliquot of control cells; and

8 comparing the measured parameters of the first and second aliquots of cells,
9 wherein a change in the parameter is associated with a change in Rheb activity.

1 26. The method of claim 25, further comprising:

2 utilizing the candidate compound as a lead compound for drug development
3 for the disease associated with abnormal cell growth.

- 1 27. The method of claim 25, wherein the candidate compound inhibits
2 Rheb activity.
- 1 28. The method of claim 25, wherein the Rheb protein is human or
2 Drosophila Rheb protein.
- 1 29. The method of claim 25, wherein the measured parameter is cell size.
- 1 30. The method of claim 25, wherein the parameter is glucose uptake or
2 utilization.
- 1 31. A method for screening a library of candidate compounds to identify a
2 lead compound for drug development for a disease associated with abnormal cell growth,
3 comprising:
4 contacting the candidate compounds with cells overexpressing a Rheb protein
5 under suitable conditions and for a period of time sufficient to affect Rheb activity
6 measuring a parameter of the contacted cells for a change in phenotype
7 associated with Rheb antagonist activity; and
8 determining whether a candidate compound inhibits Rheb activity to identify a
9 Rheb antagonist.
- 1 32. The method of claim 31, further comprising:
2 utilizing the Rheb antagonist as a lead compound for drug development for the
3 disease associated with abnormal cell growth.
- 1 33. The method of claim 31, wherein the Rheb protein is human or
2 Drosophila Rheb protein.
- 1 34. The method of claim 31, wherein the measured parameter is cell size.
- 1 35. The method of claim 31, wherein the parameter is glucose uptake or
2 utilization.
- 1 36. A non-human, transgenic animal over-expressing Rheb protein,
2 wherein the animal has increased cell or organ size as compared with an animal not over-
3 expressing Rheb protein.

- 1 37. The transgenic animal of claim 36, comprising human or Drosophila
2 Rheb protein.
- 1 38. The transgenic animal of claim 36, wherein the transgenic animal is a
2 primate, mammal, bovine, porcine, ovine, equine, avian, rodent, fowl, piscine, or crustacean.
- 1 39. The transgenic animal of claim 38, wherein the transgenic animal is a
2 farm animal.
- 1 40. The transgenic animal of claim 39, wherein the farm animal is a
2 chicken, cow, bull, horse, pig, sheep, goose or duck.
- 1 41. A transgenic, non-human animal over-expressing whose Rheb protein,
2 wherein the over-expression results in increased size or growth rate of the animal.
- 1 42. A method for increasing the size or growth rate of a non-human,
2 transgenic animal, comprising:
3 stably introducing into a genome of an animal cell a Rheb gene, whereby Rheb
4 protein is over-expressed; and
5 producing an animal from the animal cell.